**Standards for Mathematical Practice Look Fors**

| **Student Behaviors** |
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| **1. Make sense of problems and persevere in solving them.**  *Students are:*   * Working and reading rich problems carefully (TKES 3) * Drawing pictures, diagrams, tables, or using objects to make sense of the problem (TKES 3) * Discussing the meaning of the problem with classmates (TKES 4) * Making choices about which solution path to take (TKES 5) * Trying out potential solution paths and making changes as needed (TKES 8) * Checking answers and making sure solutions are reasonable and make sense (TKES 6) * Exploring other ways to solve the problem (TKES 8) * Persisting in efforts to solve challenging problems, even after reaching a point of frustration. (TKES 8) |
| **2. Reason abstractly and quantitatively.**  *Students are:*   * Using mathematical symbols to represent situations (TKES 3) * Taking quantities out of context to work with them (decontextualizing) (TKES 3) * Putting quantities back in context to see if they make sense (contextualizing) (TKES 3) * Considering units when determining if the answer makes sense in terms of the situation (TKES 3) |
| 1. **Construct viable arguments and critique the reasoning of others**.   *Students are:*   * Making and testing conjectures (TKES 8) * Explaining and justifying their thinking using words, objects, and drawings (TKES 6) * Listening to the ideas of others and deciding if they make sense (TKES 4) * Asking useful questions (TKES 3) * Identifying flaws in logic when responding to the arguments of others (TKES 4) * Elaborating with a second sentence (spontaneously or prompted by the teacher or another student) to explain their thinking and connect it to their first sentence. (TKES 8) * Talking about and asking questions about each other’s thinking, in order to clarify or improve their own mathematical understanding. (TKES 4) * Revising their work based upon the justification and explanations of others. (TKES 8) |
| **4. Model with mathematics.**  *Students are:*   * Using mathematical models (i.e. formulas, equations, symbols) to solve problems in the world (TKES 3) * Using appropriate tools such as objects, drawings, and tables to create mathematical models (TKES 3) * Making connections between different mathematical representations (concrete, verbal, algebraic, numerical, graphical, pictorial, etc.) (TKES 8) * Checking to see if an answer makes sense within the context of a situation and changing the model as needed (TKES 8) |
| **5. Use appropriate tools strategically.**  *Students are:*   * Using technological tools to explore and deepen understanding of concepts (TKES 3) * Deciding which tool will best help solve the problem. Examples may include: (TKES 3) * Calculator * Concrete models * Digital Technology * Pencil/paper * Ruler, compass, protractor * Estimating solutions before using a tool (TKES 3) * Comparing estimates to solutions to see if the tool was effective (TKES 3) |
| **6. Attend to precision.**  *Students are:*   * Communicating precisely using clear language and accurate mathematics vocabulary (TKES 1) * Deciding when to estimate or give an exact answer (TKES 1) * Calculating accurately and efficiently, expressing answers with an appropriate degree of precision (TKES 1) * Using appropriate units; appropriately labeling diagrams and graphs (TKES 1) |
| **7. Look for and make use of structure.**  *Students are:*   * Finding structure and patterns in numbers (TKES 1) * Finding structure and patterns in diagrams and graphs (TKES 1) * Using patterns to make rules about math (TKES 1) * Using these math rules to help them solve problems (TKES 1) |
| **8. Look for and express regularity in repeated reasoning.**  *Students are:*   * Looking for patterns when working with numbers, diagrams, tables, and graphs (TKES 1) * Observing when calculations are repeated (TKES 8) * Using observations from repeated calculations to take shortcuts(TKES 8) |

\**Please note that most of the teacher and student behaviors listed can be paired with more than one TKES indicator.*

| **Standards for Mathematical Practice Teacher Behaviors** |
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| **1. Make sense of problems and persevere in solving them.**  *Teachers are:*   * Providing rich problems aligned to the standards (TKES 1) * Providing appropriate time for students to engage in the productive struggle of problem solving (TKES 8)   *Teachers ask:*   * What information do you have? What do you need to find out? What do you think the answer might be? * Can you draw a picture? How could you make this problem easier to solve? * How is \_\_\_’s way of solving the problem like/different from yours? Does your plan make sense? Why or why not? * What tools/manipulatives might help you? What are you having trouble with? How can you check this? |
| **2. Reason abstractly and quantitatively.**  *Teachers are:*   * Providing a variety of problems in different contexts that allow students to arrive at a solution in different ways (TKES 4) * Using think aloud strategies as they model problem solving (TKES 3) * Attentively listening for strategies students are using to solve problems (TKES 5)   *Teachers ask:*   * What does the number \_\_\_\_ represent in the problem? How can you represent the problem with symbols and numbers? * Can you make a chart, table or graph? |
| 1. **Construct viable arguments and critique the reasoning of others.**   *Teachers are:*   * Posing tasks that require students to explain, argue, or critique (TKES 8) * Providing many opportunities for student discourse in pairs, groups, and during whole group instruction (TKES 4)   *Teachers ask:*   * Why or why not? How do you know? Can you explain that? Do you agree? * How is your answer different than \_\_\_\_\_’s? What math language will help you prove your answer? * What examples could prove or disprove your argument? What questions do you have for \_\_\_\_? |
| **4. Model with mathematics.**  *Teachers are:*   * Providing opportunities for students to solve problems in real life contexts (TKES 3) * Identifying problem solving contexts connected to student interests (TKES 4)   *Teachers ask:*   * Can you write a number sentence to describe this situation? What do you already know about solving this problem? * What connections do you see? Why do the results make sense? Is this working or do you need to change your model? |
| **5. Use appropriate tools strategically.**  *Teachers are:*   * Making a variety of tools readily accessible to students and allowing them to select appropriate tools for themselves (TKES 3) * Helping students understand the benefits and limitations of a variety of math tools (TKES 8)   *Teachers ask:*   * How could you use manipulatives or a drawing to show your thinking? * Which tool/manipulative would be best for this problem? What other resources could help you solve this problem? |
| **6. Attend to precision.**  *Teachers are:*   * Explicitly teaching mathematics vocabulary (TKES 1) * Insisting on accurate use of academic language from students (TKES 8) * Modeling precise communication (TKES 10) * Requiring students to answer problems with complete sentences, including units (TKES 10) * Providing opportunities for students to check the accuracy of their work (TKES 5)   *Teachers ask:*   * What does the word \_\_\_\_ mean? Explain what you did to solve the problem. * Compare your answer to \_\_\_\_\_’s answer What labels could you use? * How do you know your answer is accurate? Did you use the most efficient way to solve the problem? |
| **7. Look for and make use of structure.**  *Teachers are:*   * Providing sense making experiences for all students (TKES 2) * Allowing students to do the work of using structure to find the patterns for themselves rather than doing this work for students (TKES 8)   *Teachers ask:*   * Why does this happen? How is \_\_\_\_ related to \_\_\_\_? Why is this important to the problem? * What do you know about \_\_\_\_ that you can apply to this situation? How can you use what you know to explain why this works? * What patterns do you see? |
| **8. Look for and express regularity in repeated reasoning.**  *Teachers are:*   * Providing sense making experiences for all students (TKES 2) * Allowing students to do the work of finding and using their own shortcuts rather than doing this work for students (TKES 8) * *Teachers ask:* * What generalizations can you make? Can you find a shortcut to solve the problem? * How would your shortcut make the problem easier? How could this problem help you solve another problem? |